



B1
Sub C

1. A piezoelectric generator comprising an oscillator package, including a piezoelectric oscillator sealed in a container and electrodes for external connection formed on the surface of the container, and an electronic component mounted integrally on the oscillator package, wherein,

said container is composed of a multi-layer substrate having a substantially quadrangular shape and having a recess for the storage of the piezoelectric oscillator and a lid member fixed to the multi-layer substrate so as to cover the recess;

said electrodes for external connection are projecting electrodes each formed of a conductive material and having a height greater than the mounting height of the electronic component, and are arranged on the surface of the multi-layer substrate on the side opposite the lid member near the four corners thereof; and

said electronic component is mounted on the same surface of said container that carries the electrodes for external connection thereon.

5. The piezoelectric generator according to claim 1, wherein said projecting electrode is a ball-shaped electrode formed of a solder ball.

6. The piezoelectric generator according to claim 1, wherein said electronic component is composed of an IC chip and a capacitor.

B2

8. The piezoelectric generator according to claim 7, wherein said sealing resin for sealing the IC chip is injected from the side of an area on which the capacitor is not mounted.

RECEIVED
JUL 15 2002
TECHNOLOGY CENTER 2800

*B3
Cmt*
9. The piezoelectric generator according to claim 1, wherein said electronic component is composed of at least an IC chip and said IC chip and said multi-layer substrate has an inspection terminal for the piezoelectric oscillator in a position within the IC chip mounting area and off connecting terminals of the IC chip.

*B3
Cmt*
11. The piezoelectric generator according to claim 1, wherein the outer peripheral sidewall surface of said multi-layer substrate is provided with a terminal for adjustment.

12. A structure for mounting a piezoelectric generator on a mountable substrate, the piezoelectric generator being the piezoelectric generator according to claim 1, the mountable substrate having a recess hole formed therein, and at least a part of the electronic component of the piezoelectric generator being adapted to be stored in the recess or hole of the mountable substrate when the electrodes for external connection of the piezoelectric generator are connected to the mountable substrate.

*SIM
C2
cnt*
13. A piezoelectric generator comprising:

a container including a metallic cap put on the upper surface of a substrate in the form of a quadrangular flat plate, the cap having a skirt portion bonded to the substrate so as to define a space in which a crystal oscillator is to be sealed between the substrate and the cap; the crystal oscillator placed on the upper surface of the substrate in the container; electrodes for external connection arranged on the peripheral portion of the lower surface of the substrate so as to project downward from the lower surface of the substrate; and an electronic component mounted on the lower surface of the substrate;

*B3
C1
Sub
C2
C1C2*
16.

wherein said electrodes for external connection are formed of a conductive material and project from the substrate so that the projecting end is in a position below the level of the electronic component mounted on the substrate.

17. The piezoelectric generator according to claim 13, wherein each said electrode for external connection is a ball-shaped electrode formed of a solder ball.

18. The piezoelectric generator according to claim 1 or 13, wherein said electronic component is composed of an IC chip only.

*B4
C1C2*
21.

21. A piezoelectric generator comprising:

an oscillator package, including a piezoelectric oscillator sealed in a container and electrodes for external connection formed on the surface of the container, and an electronic component mounted integrally on the oscillator package, wherein the electronic component is mounted on the same surface of said container that carries the electrodes for external connection thereon, and wherein the electrodes are ball-shaped and are each formed from a solder ball.

22. The piezoelectric generator according to claim 21, wherein the solder ball includes a spacer member.

23. A piezoelectric generator comprising:

B4
cont.

a container including a metallic cap put on the upper surface of a substrate in the form of a flat plate, the cap having a skirt portion bonded to the substrate so as to define a space in which a crystal oscillator is to be sealed between the substrate and the cap;

the crystal oscillator placed on the upper surface of the substrate in the container; ball-shaped electrodes for external connection arranged on the peripheral portion of the lower surface of the substrate; and

wherein each ball-shaped electrode for external connection is formed from a solder ball.

24. The piezoelectric generator according to claim 23, wherein the solder ball includes a spacer member.

25. A piezoelectric generator comprising:

an oscillator package, including a piezoelectric oscillator sealed in a container and electrodes for external connection formed on the surface of the container, and an electronic component mounted integrally on the oscillator package, wherein the electronic component is mounted on the same surface of said container that carries the electrodes for external connection thereon,

wherein the electronic component is composed of an IC chip and a capacitor, wherein the IC chip is mounted substantially on the central portion of the multi-layer substrate, said capacitor is mounted adjacent to one side of the IC chip, and an injection area for a sealing resin is provided on the other side of the IC chip.

26. A piezoelectric generator comprising:

*B4
and 8*
a container including a metallic cap put on the upper surface of a substrate in the form of a flat plate, the cap having a skirt portion bonded to the substrate so as to define a space in which a crystal oscillator is to be sealed between the substrate and the cap;

the crystal oscillator placed on the upper surface of the substrate in the container; electrodes for external connection arranged on the peripheral portion of the lower surface of the substrate; and

an electronic component mounted on the lower surface of the substrate; wherein the surface of said container is provided with crystal oscillator connection terminals, and through holes formed in the substrate to connect the crystal oscillator connecting terminals and the crystal oscillator are situated in a region where the cap is superposed on and bonded to the substrate.
